




Defining the Analysis Scope to Support Decisions While Ensuring the Technical Acceptability of the Results





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Issue/Challenge

*"When operated within their design specifications, Physical Security Modeling and Simulation (PSMS) tools have progressed to a point that they can be counted on to produce a high-quality measurement of the facility's security posture and risk profile. However, successful implementation of PSMS is somewhat uncommon in the civil nuclear industry." **


Two challenges must be addressed:

- How to take current data and facility knowledge and transform them into the input needed for PSMS analysis.
 - Addressed in recent papers and in presentations on *Facility Characterization, PSMS Applications, Model Robustness, VV&A, Risk Drivers*.
- Lack of a context for how the PSMS analysis results will fit into existing decision processes, regulatory requirements, and security design requirements of the organization.
 - Addressed broadly in a recent paper, but greater emphasis needed.

*Fogarty, S. P., "The Role of Modeling and Simulation in Risk-Informed Decision Making", Proceedings of the 56th Annual Meeting of the Institute of Nuclear Materials Management, July 2015.



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Optimizing Fidelity AND Ensuring Quality


Given the similarities between PRA and PSMS analyses it is natural to look at the current risk informed decision process (RG 1.174) as a template for risk-informing security.

Expectations for Risk-informing Security

- The security impact of a change will be evaluated in an integrated risk management approach that broadly identifies risk reduction opportunities rather than just trying to eliminate requirements that the facility identifies as undesirable.
- Any analyses conducted to support a change will be at a **level of detail commensurate with the significance of the change**, will include as-built, as-operated, and as-maintained facility configurations, and will reflect actual facility operating experience.
- The PSMS analysis supporting the change will be subjected to **quality assurance and quality control methods**.
- Uncertainties will be appropriately considered in a PSMS analysis including a program to address significant uncertainties.
- Data, methods, and assessment criteria used to support decision-making will be well documented.




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Change Significance

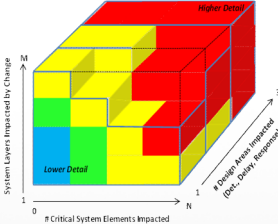
Change significance can be addressed by answering the following questions:

- How critical to overall performance are the system elements that are impacted by the change (i.e., sensitivity)?**
 - We define the term "Critical System Elements" to refer to these important parts of the system much like "safety significant", "important to safety", or "safety class" are used in the safety community.
- Does the change impact multiple layers (i.e., OCA, PA, VA) of the defensive strategy (e.g., Defense-in-Depth)?**
 - Example: A change in strategy from a denial emphasis to a pursuit/flex emphasis typically reallocates security officers from perimeter layers to interior layers.
- How many "design areas" are impacted by the change (i.e., detection, interruption, and neutralization)?**
 - As each design area is required for an effective system, impacting more than one area can be significant.



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Determining Level of Detail Required



- Generally the greater the change significance the higher the level of fidelity required in the PSMS analysis.
- Applies equally well for determining level of detail in any subsequent implementation/monitoring program.



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Ensuring Quality

Nuclear quality standards, practices, and implementation are more mature in the safety community than in physical security. Experience indicates nuclear security professionals need to focus on:

- Peer review.** Conduct and document an independent review of analysis performed by someone capable of performing the original analysis.
 - Limited number of experienced practitioners to conduct such reviews.
- Data quality.** The input data for performance of system components (e.g., detectors, barriers, etc.).
 - Unacceptable to use data without any reference to its pedigree and applicability.
- Documentation.** Physical security organizations have very limited experience providing technical reports with supporting engineering analysis to decision-makers.


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